INTERNATIONAL OPPORTUNITIES FOR PROJECT DEVELOPMENT
OIL AND NATURAL GAS SYSTEM METHANE RECOVERY AND USE

Methane is both the primary constituent of natural gas and a potent greenhouse gas when released to the atmosphere. Reducing emissions can yield substantial economic and environmental benefits. The implementation of available cost-effective methane emission reduction opportunities in the oil and gas industry can lead to reduced product losses, lower methane emissions, and increased revenues. The Methane to Markets Partnership is building international partnerships to take advantage of these opportunities by facilitating cooperative projects that expand methane leak prevention and mitigation activities and bring more gas to markets.

BACKGROUND ON GLOBAL EMISSIONS

The production, processing, transmission, and distribution of oil and natural gas is the second largest anthropogenic (human-influenced) methane source worldwide, releasing as much as 88 billion cubic meters (BCM) or 1,256 million metric tonnes of carbon dioxide equivalent ($MMTCO_2E$) of methane to the atmosphere annually. Although natural gas is a clean source of energy, methane losses from natural gas systems account for 16% of total worldwide methane emissions. Emissions primarily result from normal operations, routine maintenance, and system disruptions. Emissions vary greatly from facility to facility and are largely a function of operation and maintenance procedures and equipment conditions. Figure 1 presents methane emissions from the oil and gas sector in selected countries.

Figure 1: International Methane Emissions from Natural Gas and Oil Infrastructure
Source: EPA, 2002

Country	Methane Emissions ($MMTCO_2E$)		
	1990	2000	2010 (projected)
Russia	335.3	252.9	273.5
United States	147.6	138.2	144.8
Ukraine	71.6	60.2	39.4
Venezuela	40.2	52.2	68.0
Uzbekistan	27.2	33.7	42.9
India	12.9	24.4	54.9
Canada	17.1	23.3	23.8
Mexico	11.1	15.4	22.1
Argentina	8.0	13.7	30.5
Thailand	2.9	8.6	15.9
China	0.9	1.5	4.9

RECOVERY AND USE OPPORTUNITIES

Methane emissions reduction can be reduced by upgrading technologies or equipment and by improving management practices and operational procedures. Opportunities to reduce methane emissions generally fall into one of three categories:

- Technologies or equipment upgrades, such as low-emission regulator valves, that reduce or eliminate equipment venting or fugitive emissions,
- Improvements in management practices and operational procedures to reduce venting, or
- Enhanced management practices, such as a leak detection and measurement programs that take advantage of improved measurement or emission reduction technology.

Figure 2: Installation of low-bleed (low-emitting) valves can be a cost-effective way to reduce gas losses.

Cost-effective opportunities for reducing methane emissions in the oil and gas sector vary greatly from country to country based on the level of infrastructure and capital design. Many of the available cost-effective abatement options and technologies, however, can be applied universally throughout the oil and gas industry. For example, directed inspection and maintenance (DI&M) programs identify the largest methane leak sources and allow for more accurate, efficient, and cost-effective leak repairs. These DI&M programs can be applied to gas processing, transmission, and distribution operations. In countries with large oil and gas infrastructure, such as Russia and the United States, wide application of these programs could yield substantial methane emissions reduction and gas savings.

ISSUES FOR PROJECT DEVELOPMENT

Although there are many attractive ways to reduce methane emissions in the oil and gas sector, there are also several important issues to consider for successful project development. Some of the key issues include:

- Recognizing leak prevention and mitigation as a core business opportunity and directing available capital towards leak reduction projects,
- Making project investments economically viable in areas where there are artificially low natural gas prices,
- Providing robust information on and access to the many available emission reduction technologies and management practices,
- Identifying and addressing specific regulatory barriers that might inhibit project development, and
- Improving and expanding existing markets and creating new markets for methane gas.

Addressing these important issues and facilitating project development in the oil and gas industry will be a core focus of the Methane to Markets Partnership. By focusing international expertise and resources, the Partnership will work to:

- Engage the international oil and gas industry to improve awareness of emission reduction opportunities,
- Facilitate and enhance the application and broad adoption of emission reduction technologies and management practices,
- Improve and facilitate access to capital to support project investment, and
- Cooperate with country partners to improve markets and provide legal and regulatory frameworks that encourage project development.

Methane leaks and other fugitive emissions along the natural gas industry's supply chain represent product losses that can be avoided using readily available, cost-effective practices and technologies. With payback periods that are often less than one year, significant savings can result. In addition to these financial benefits, pursuing natural gas emission reductions also makes good environmental sense and effectively contributes to both natural resource presentation and good environmental stewardship.

PROJECT CASE STUDY

LEAK REDUCTION PROJECT AT NATURAL GAS SYSTEM COMPRESSOR STATIONS IN UKRAINE

The Ukrainian natural gas transmission system, the second largest in Europe, is 35,000 kilometers in length and contains 171 compressor stations. Cherkasytransgas, one of six Ukrainian gas system subsidiaries, received a USAID "EcoLinks" grant for $50,000 to identify and repair methane emissions leaks at Cherkasytransgas compressor stations. Specifically, the grant allowed for: 1) purchase of methane emissions detection equipment; 2) training on leak measurement detection plan development and actual leak repair implementation; and 3) measurement of leak-repair success.

Upon receipt of emissions detection equipment, Cherkasytransgas ran measurement studies and determined that 103 million cubic feet of methane (3 million cubic meters) per year was leaking from only two compressor station sites. Through successful methane emissions identification, repair and measurement, Cherkasytransgas is now reducing over 68 million cubic feet (2 million cubic meters) of methane emissions per year from these two compressor stations. Cherkasytransgas currently is rolling out this successful methane emissions reduction project to all of their 23 compressors stations.

Photo: *Technicians using a high-flow sampler to quantify methane emission leak rate at a Cherkasytransgas compressor station.*

For more information, contact Roger Fernandez at fernandez.roger@epa.gov or 202-343-9386.